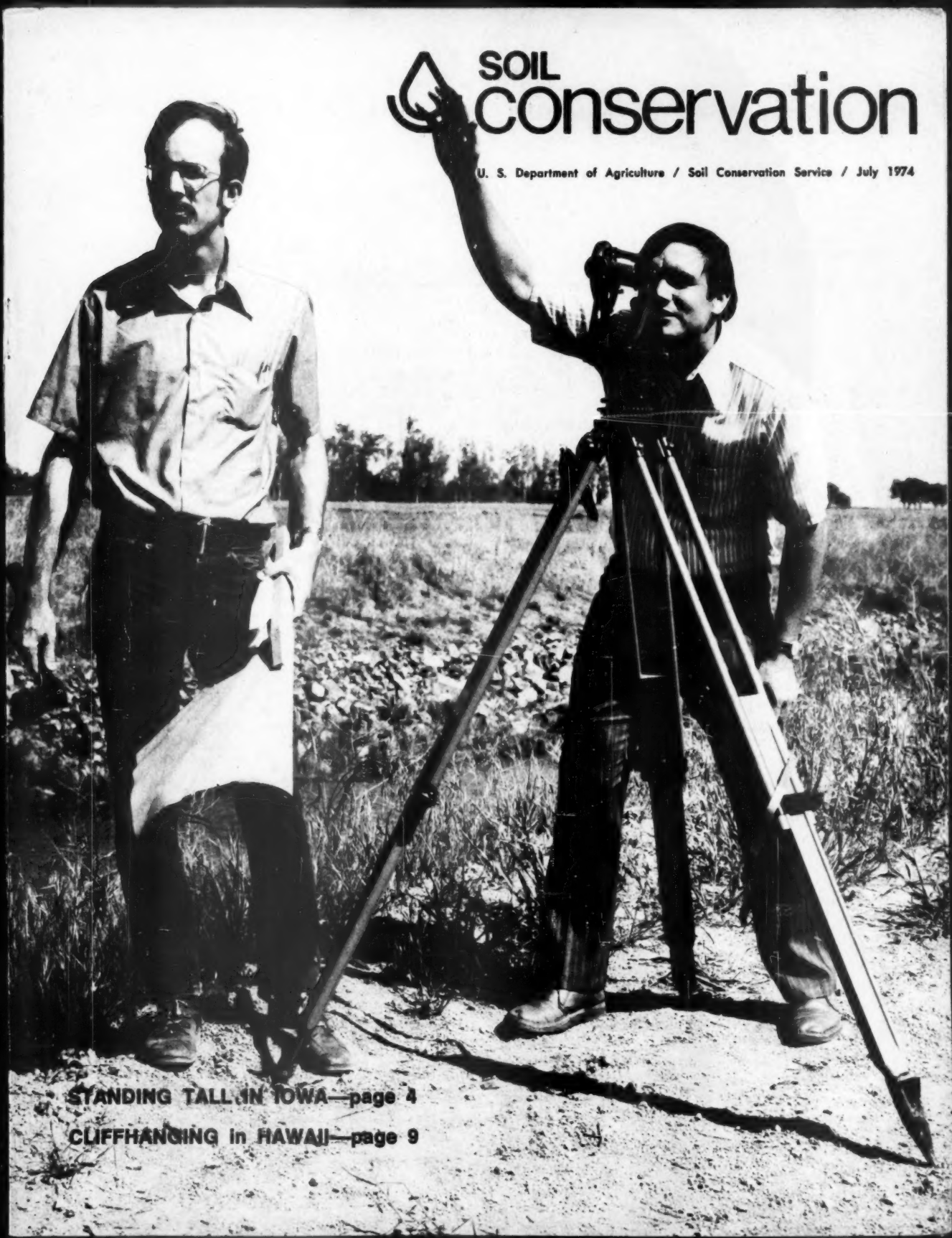
SOIL conservation

U. S. Department of Agriculture / Soil Conservation Service / July 1974



STANDING TALL IN IOWA—page 4

CLIFFHANGING in HAWAII—page 9

Where it's at

The Department of Agriculture is no stranger to land use problems, conflicts, and decisions.

The Soil Conservation Service and other USDA agencies have been helping local people make decisions about the use of land for many years.

Through education, persuasion, and incentives we have encouraged land users to protect and conserve soil and water and to improve farm and ranch management. We have helped to prevent floods in rural areas. We have helped to plan and build hundreds of new lakes and millions of new ponds. Through Resource Conservation and Development Projects we have worked to improve numerous aspects of rural and small town life and land use. And this by no means exhausts the list of examples.

It would not be stretching things to describe the Department of Agriculture as America's original land use agency. A major reason is that USDA works directly with the people who own and manage more than half of America's land—the nation's farmers and ranchers.

USDA is a source of resource facts second to none in the land use field. SCS for example is directly involved in soil surveys, river basin studies, snow surveys, range site surveys, and an enlarged inventory of the nation's conservation needs. We are working to strengthen our land inventorying and monitoring. Task forces are now at work on definitions of prime agricultural, grazing, and forest lands. New procedures for monitoring erosion and sedimentation work also are being developed.

SCS specialists help to interpret our information on soil, water, and other resources so that farmers and urban planners can readily apply it to their own work.

And SCS, along with its sister agencies in the Department of Agriculture, has the delivery system to facilitate the movement of new information from the office or laboratory out to the land and landowners. The same system brings invaluable field experience quickly from the countryside into the Washington conference room.

We work, too, on improving our delivery system. The aim is better coordination among federal agencies, more understanding relations with individuals and organizations involved in land planning, and broader contacts with the general public.

Information delivery is a two-way street. While we are working to make our information available, we must listen carfully to land users and planners and the public at large to make sure we understand their needs and interests.

Land use planning has always been a basic part of good farming and ranching. Farmers and ranchers will continue to be among the major architects of future land use policy. They should be fully represented in all planning councils so that their knowledge and experience can benefit all Americans.

Kenneth E. Grant

SOIL conservation

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COVER: Soil Conservation Service employees at work on a watershed project near Dixon, California. District Conservationist Denis G. Nickel sights the level assisted by Soil Conservationist Jack R. Carlson.

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A green future for prairie grasses?

by John Maddy
Agronomist, SCS
Des Moines, Iowa

Can native prairie grasses, which once abounded and fed wild buffalo, be cultivated for cattle grazing?

Soil conservationists and farmers in Iowa are looking for the answer by performing tests on switchgrass, indiangrass, big bluestem, and other warm season grasses native to Iowa. The Soil Conservation Service Plant Materials Center at Elsberry, Missouri, is supplying most of the seed for the field trials. Farmers have seeded more than 1,000 acres of the grasses so far, mostly in southern Iowa. And the results are encouraging.

Proper Cultivation

Most of the native grasses of Iowa grow fastest during the warm—or hot—summer season. When reintroducing these warm season grasses, the idea is to grow them in a separate pasture from cool season grasses. Farmers report it takes 30 to 40 percent as much warm season grasses as cool season for a balanced pasture program. When production of bromegrass, orchardgrass, and other cool season grasses begins to taper off in early July, warm season grasses, which green up in May, are 1½ to 2 feet high and ready to graze. These native grasses will produce as much forage in July and August as cool season grasses yield early and late in the grazing season. And they'll support the same number of cattle.

The use of warm and cool season grasses in a grazing program helps to stop overgrazing by cattle, an important benefit to conservation-minded farmers. Warm season grasses should not be grazed closer to the ground than 10 to 12 inches which leaves quite a protective canopy! And since the grasses are grazed only 2 months out of the year, they appear to have great potential as wildlife habitat and nesting cover.

Weeds can be a problem in establishing stands. Using a herbicide in mid-May to control weed growth gets the grasses off to a good start. The use of fertilizer in late May, when warm season grasses can make the best use of it, helps established stands.

Yearling cattle grazing on switchgrass in Union County, Iowa.

Vote of Confidence

Dr. Thomas McMillan, physician and farmer near Leon, Iowa, is optimistic. "I was surprised to find no native grass pastures in Iowa when I moved here from Nebraska. I think they'll work here. But you can't overgraze them."

Bill Rountree, plant materials specialist at the SCS Plant Materials Center at Elsberry, Missouri, believes warm season grasses haven't worked in the past because they were not managed well and were grazed to the ground. Rountree has helped guide and evaluate the field trials of prairie grasses in Iowa for about 5 years.

Merlin Bintz of Minden who has had 30 acres of native grass for 5 years expresses his views this way. "What pleases me is to see my cows content under shade trees on a hot summer day when other cows are out in the hot sun looking for food."

Dean and Lyle McCunn of Red Oak who have seeded about 30 acres report no problems in getting their cattle to eat the native grasses. "The yearlings grazed the switchgrass really well," Dean says.

Others May Benefit

Cattle may not be the only ones who enjoy native Iowa grasses. The Chariton Valley Resource Conservation and Development Project is conducting a field test to see whether these grasses are equally rewarding to quail, pheasants, and other wildlife. The Iowa Conservation Commission, Lucas, Wayne, and Appanoose Soil Conservation Districts, the Army Corps of Engineers, the SCS, and several farmers are working together on it.

Ten 10-acre plots have been planted to native grasses around Lake Rathbun, an 11,000-acre recreation pool. SCS has provided technical help and some of the seed as well as information on cattle stocking rates and grazing lengths. The Iowa Conservation Commission provided the rest of the seed, labor, equipment, fertilizer and chemicals. They also arranged with private landowners to graze the pastures at the rate of two cattle an acre during the summer grazing season.

Commission biologists are evaluating the pastures as nesting areas for quail and pheasants. During future summers they will analyze each of the the 10 experimental areas before mid-July. They'll obtain data on nesting densities and the success rates of nests of bobwhite quail and ringnecked pheasants.

Prospects Are Promising

So far, then, the news from Iowa on the use of native warm season grasses is good. They don't cure pasture problems. And they can't replace cool season grasses. Instead of feast in June and famine in August, however, integration of warm and cool season grasses holds a promise of a steady year-round diet for cattle. ♦

The old neighborhood is changing, but this worried-looking barn swallow can still find a place to nest.

PREFABS for PHOEBES and BARN SWALLOWS

by *Gene A. Whitaker*
Biologist, SCS
College Park, Maryland

Cave, bungalow, lair, nest — every living creature needs a home. But what do you do if you're a bird and "progress" rips out the old homesite?

If you're lucky, the progress-bringers help you find a new one.

The barn swallow and the phoebe are two birds which long ago abandoned their natural nesting habitat in caves and under overhanging cliffs for the security of manmade structures. They attached their mud-and-grass nests to the rough beams of old wooden barns or the underside of wooden bridges. There they raised their young and took off on their daily flights to forage for the flies, beetles, and other insects which plague the farmer and home gardener.

Yet today these valuable birds are losing their homes. Wooden barns are becoming scarce and the old wooden bridges of rural America are being torn down and replaced by cheaper, smooth-surfaced pipe or box culverts.

The culverts improve roadways and drainage ditches for people, but the barn swallow and phoebe find it difficult to attach their nests to the slick-sided metal or concrete.

As a Soil Conservation biologist, I decided to do something about the problem. I started by looking under numerous bridges to see what the birds themselves preferred as a home.

I found that most barn swallows and phoebes nested on narrow shelves at least 5 inches below the roof of the bridge. Only one or two phoebes would be under the same bridge; a large number of barn swallows would live under one bridge, but always at least 6 feet apart.

So I designed an inverted T-support structure to duplicate these nesting conditions as closely as possible (see drawing).

The general design for use in round culverts is a 2- by 6-inch piece of rough lumber about 2 feet long. This is nailed down the center by a 1- by 8-inch wood support about 2 feet long. This gives a narrow shelf with its "head" pointing upstream and tail downstream to minimize any hangup of debris from a major flood. The design, incidentally, is the general shape of a barn swallow in flight.

Another design is used for square box culverts or concrete bridges. Here, a 2-inch by 2-inch square board a few feet long is attached to the side of the culvert or bridge. It's placed about 6 inches from the top.

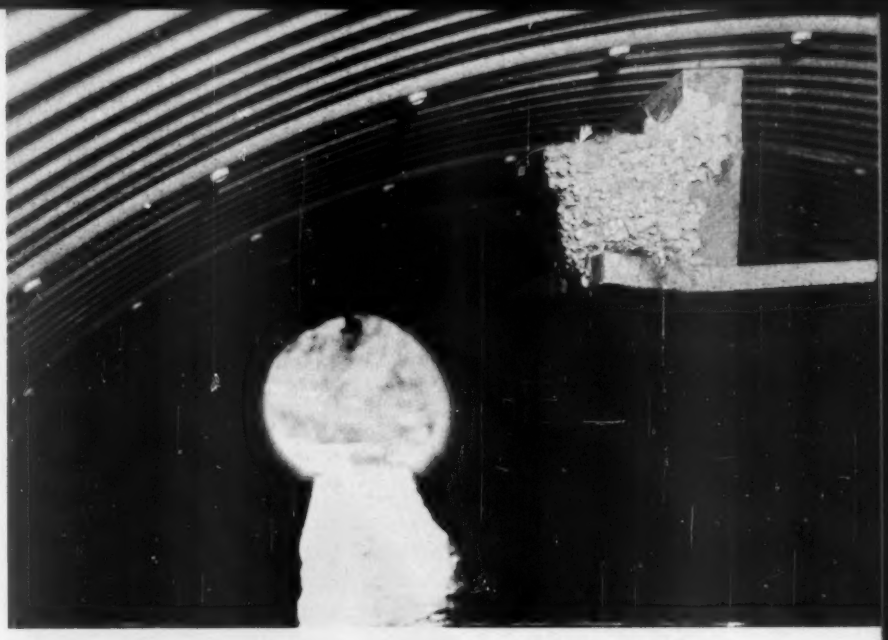
In the summer of 1972, the Division of Soil and Water Conservation of Delaware's Department of Natural Resources and Environmental Control made 26 of these new structures and tested them in six different locations.

The first four went into a newly installed set of 60-inch corrugated metal pipes, which had replaced an old wooden bridge. When workers returned to the site 4 days later, barn swallows had nested in three of the structures and were already laying their eggs.

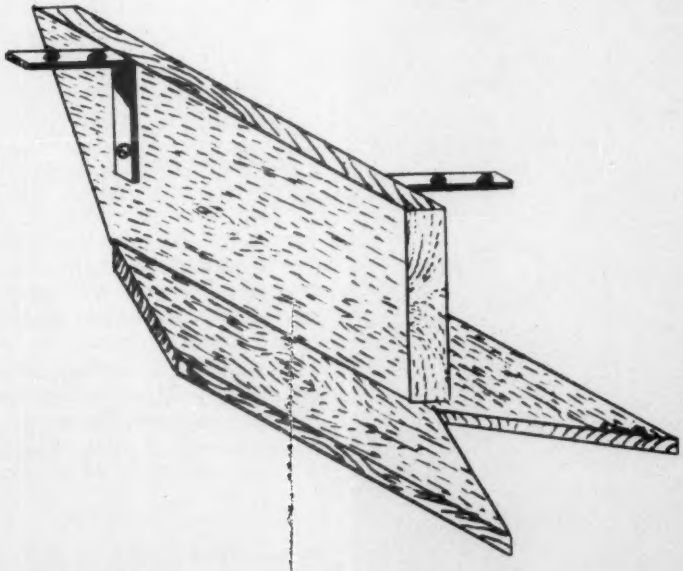
Last year, 19 of the 26 mod "birdhouses" were used by barn swallows or phoebes. Every nesting site had birds, although not every structure was used.

The wooden nesting structure is attached inside the top of new culverts as the culverts are installed. Nails were first used to hold them to the pipes, but large screws are now preferred. A hole is drilled in the concrete pipe and an expandable anchor is inserted and attached to the nest with a pair of small metal angles and screws.

The structures are safe from normal mammal or reptile predators, and the possibility they will be flooded out is small if the culverts are designed according to good engineering standards.



At home in Culvert Heights.



The basic design.

Delaware has made it a statewide policy to install these or similar structures in all new culverts. Bird lovers in Maryland and New Jersey are working for a similar program.

There's also an attractive private citizen aspect. Boy and Girl Scouts or other conservation-minded people can help by building and installing these structures in existing pipes or culverts; highway departments should be happy to give your group permission. The Soil Conservation Service in Maryland can provide the design. The expense is low and the satisfaction high.

There's room for everyone in the environment — even if you're only 3 inches tall and plan to live in a culvert. ♦

In many ways . . .

New Mexico plants a great idea

by Tom Anderson
District conservationist, SCS
Silver City, New Mexico

A year ago you couldn't buy native New Mexican plants in New Mexico nurseries. Plants like rubber rabbitbrush, yucca, sacahuista, desert willow, New Mexican forestiera. Now you can because students at the Southwest New Mexico School for the Handicapped are growing and selling the first native plant stock to be certified for sale in New Mexico.

The idea came from the Southwest New Mexico Resource Conservation and Development (RC&D) Council, which matched up requests for help from two groups to solve the problems of each.

One group, the Southwestern New Mexico Services to Handicapped Children and Adults, Inc., near Silver City, New Mexico, wanted learn-by-doing opportunities for its handicapped clients at the school.

Another group, the local chapter of the American Association of University Women, wanted to see a commercial source of native New Mexican plants established. The women felt that native plants could be used in landscaping because they are showy, colorful and unusual, and require little, if any, watering.

To get the project going, RC&D project coordinator Bob Abercrombie contacted the Board of Supervisors of the Grant Natural Resource Conservation District. At the Board's request, the Soil Conservation Service furnished soil information, helped identify suitable plant species, and drew up a conservation plan which specified the necessary land preparation, water and fertilizer requirements, and fencing, planting and harvesting procedures.

Abercrombie also asked a business research class at Western New Mexico University to study the need for, and supply of, native plants. The class discovered that there was indeed a significant demand for these plants. They also discovered that none of New Mexico's 263 nurseries offered native plants for sale, that no native plants were certified by the New Mexico Department of Agriculture, and that laws prohibit removing such plants from federal land.

Barbara Gray, an official of the School for the Handicapped, chose a 1-acre tract near the school for a nursery.

Barbara Gray and Bob Abercrombie admire a rabbitbrush plant.

A. A. Valerio was appointed director of the program. This left only one problem: how to secure seed and initial stock that could be certified by the State Department of Agriculture.

The SCS Plant Materials Center at Los Lunas, New Mexico, had already developed improved strains of several native plants. They were ready for certification and release but someone—or some group—was needed to grow the plants commercially. Through the Grant Natural Resource Conservation District, plants and seeds were secured for the School for the Handicapped.

At the Los Lunas Plant Materials Center, Mr. Valerio learned more about handling nursery stock. Then, under his supervision, boys from the school constructed a 9-foot-tall woven wire fence to protect the new plants from wildlife damage. They also prepared the land for planting, irrigated and harvested the seed, and learned how to pot the young plants for market.

After less than a year of operation, the nursery is a success. Requests for the yucca, desert willow, and other shrubs come from schools, airports, the state highway commission, and many businesses and individuals.

Native southwestern plants are making a comeback—and helping handicapped people do the same. Colorful plants and concerned people are providing young New Mexicans with nursery management skills that can lead to a worthwhile occupation in future years. ♦

MYSTERY of the FALLING CLIFFS

It's no riddle how a pounding ocean surf could erode away the lower cliffs at Paukaa, on the coast of the Big Island of Hawaii. Much more mysterious was the slow erosion of the upper part of this cliff next to a U.S. Coast Guard lighthouse.

The Coast Guard asked the directors of the Mauna Kea Soil and Water Conservation District to find out why the upper part was continually eroding and how they could stop or slow the process.

Soil Conservation Service technicians pointed out the unusual properties in the soil at the top of the cliffs. Once dried, the soils cannot absorb moisture. Instead, they shrink dramatically and fall apart, flaking off the cliff like scales from a dead fish and exposing a deeper soil layer to the same process.

Armed with this information Coast Guard officials followed a district recommendation to reshape the eroded area into a less steep bank. Then they planted dwarf pangolagrass developed at the SCS Hawaii Plant Materials Center. Fertilizer was used in each planting hole and is still applied two or three times a year because of the soil's low natural fertility.

Today, stands of the dwarf pangolagrass keep the soil at the top of the cliff from completely drying and flaking off and also help to beautify the area.—Max S. Coray, district conservationist, SCS, Honokaa, Hawaii. ♦

Preparing an eroded clifftop for planting.

Growing grass on rock

by Leroy E. Werchan
Soil scientist, SCS
Austin, Texas

How do you grow grass on a barren rock quarry?

With difficulty—that's how.

The United States Gypsum Company's New Braunfels, Texas, office gave it a try, with help from their local soil and water conservation district. And today, they've established a dense stand of natalgrass, Selection 75 kleingrass, Kleberg bluestem, johnsongrass, weeping lovegrass and buffalograss.

Delbert J. George, the company's works manager at New Braunfels, said the company hopes to revegetate the same amount of land yearly that they disturb in their quarry operations—about 10 acres.

"We want to repair the ugly scars of mining, clean up the stream nearby, and bring more wildlife back to the area," said George. "We think we can do it—but it sure isn't easy."

George and SCS District Conservationist R. B. McDonald began the job 2 years ago. McDonald knew there were no cut-and-dried methods for growing grass on the steep sides and rough bottoms of the limestone rock quarry. So he experimented.

McDonald and SCS plant specialists picked a tough test site for their first try. It was an 80-foot-high crushed-rock slope that tilted at a 45° angle.

First, most of the area was bulldozed to a 20° angle. What couldn't be altered was left in a steep slope, then covered with a few truckloads of soil. Most of the soil promptly tumbled down the hillside, but enough remained in place—about half an inch—to give some hope the steep area could be "greened up".

Then, McDonald got 21 varieties of grass seed from an SCS plant materials center and —for almost 2 days—he and United States Gypsum employees planted the grasses in small separate test plots. Some of the newly planted seed was fertilized, some was only mulched, and some seed plots were both fertilized and mulched.

As spring of 1972 came around, a number of grasses sprouted. Things looked promising until a torrential May rainstorm devastated much of the test site and only a handful of grasses survived. Interestingly, most of them were on the ½-inch topsoil covering the steepest slopes.

Although the heavy rains and subsequent soil erosion ruined most of the first year plantings, the fact that even some grass survived in this hostile environment was so heartening that SCS and the mining company decided to make another try in 1973.

Last year, more soil was added to the quarry area—a reddish, noncalcareous, gravelly clay soil that came from the mine surface. A 2- to 4-inch layer was spread over the area washed out in 1972, and part of the steepest area was smoothed to a more gentle slope.

The results were excellent. Luxuriant, dark green, waist-high grasses sprang up to cover what—a few months before—had been gray, crushed rock surface. Even the slope with only a scant ½-inch of soil had a dense cover of green. "I wish," said mine official Delbert George, "that we had planted 40 acres instead of 4."

Which of the 21 grasses on trial won the blue ribbon? Natalgrass—an African import —made the best growth, while the others were strong runners-up.

Turning the quarry green is costing United States Gypsum about $600 an acre—but they feel it's money well spent. Their grass does more than look beautiful. It's healing the earth's scars, making local creeks run cleaner, and bringing back the wild deer and turkey. ♦

Park planning is no picnic!

by J. Kent Hortin
District conservationist, SCS
and Ivan L. Lines, Jr.
State biologist, SCS
Salt Lake City, Utah

Good recreation land around big cities that hasn't already been gobbled up by developers often carries a premium price tag. The area around Salt Lake City, Utah, is no exception. This makes it tough to be in the shoes of Gary Swenson, director of the Salt Lake County Parks and Recreation Department.

Swenson believes the energy shortage will result in a greater demand for local recreation areas. Vacations for Americans in the future are likely to include fewer long distance car trips and more use of recreation facilities within walking, bicycling, or short driving distance of their homes.

"We're not sure how we'll meet this increased demand, but we are sure that we'll have to be more selective in our acquisition and development plans. We'll be leaning quite heavily on the Soil Conservation Service to help us with new site selection and development," Mr. Swenson said.

One way to provide more nearby recreation areas and avoid the high land costs, says Swenson, is "to develop school grounds with a more park-like setting. They could function as school grounds, local parks, and picnic areas, as well as being part of the school's environmental education program. We could satisfy more of the demand for recreation with little extra expense for either the schools or the Salt Lake County Parks and Recreation Department. To this end, we will make our landscape architects available to interested schools."

The Soil Conservation Service helps park and recreation planners by providing them with soils information about their land and water. Recently SCS provided soil survey reports and interpretations on Utah's Little Cottonwood Regional Park.

This kind of information alerts planners to possible problems such as unstable soils —highly undesirable for volleyball courts, cabins, or other buildings which may eventually crack or shift. It shows planners where they may face soil or water problems when they plan for drainage, irrigation, or septic tank filter fields. Preventing land use mistakes can save the taxpayer hundreds of thousands of dollars in repair or renovation bills.

Soils information and other on-site assistance also is valuable in helping planners choose new park or school areas; in designing useful and attractive ponds or wildlife areas; and in selecting the best grass, shrubs or trees for durability, easy maintenance, erosion control, and beauty. And that's just a start!

Swenson is pleased with SCS help in his plans to bring more recreation opportunities to the people of Salt Lake County. "Cooperation with the Soil Conservation Service, particularly in recent years, has been excellent. I don't know why we didn't get together sooner." ♦

(Photograph courtesy of the Utah Travel Council.)

Taking a shot at archery golf

by Gordon C. Postle
Executive Secretary
Licking County, Ohio
Soil and Water
Conservation District

For 32 years, Charles Minnich engineered trains from Columbus to Pittsburgh to Wheeling to Zanesville and back again. Watching the Ohio - Pennsylvania - West Virginia countryside roll by, he often dreamed of a place to call his own.

In 1958, his dream came true when he purchased a 175-acre farm in the rolling hills of Licking County, Ohio.

A champion bow and arrow archer, Minnich became intrigued by the new game of archery golf and decided to build a pay-for-play course on his farm. He turned to the Soil Conservation Service for help on setting up the course, using soil survey information and on-site advice from the local district conservationist.

"Planning a farm for outdoor sports is pretty common," said Minnich, "but an archery golf course is so new there aren't many guides to follow except what the land itself tells you. I believe I have the second archery golf course ever built in this country."

What is archery golf? It's similar to regular golf except that it's played with a bow and arrow instead of clubs.

"You begin play by shooting an arrow from a tee-off area along a fairway toward the green," said Minnich. "When your arrow hits the green, instead of putting, you try to knock a soft plastic ball, about

Charles Minnich, left, and friends tee off for a round. An SCS-designed pond is in the background.

4 inches in diameter, from its perch with a specially designed arrow. Naturally, the fewer shots to drop the ball the better."

The archery golf ball is held in place by a 4-inch high wire tee. The course itself is 4,500-yards long, with 18 fairways and accompanying tees and greens.

Besides his archery golf course, Minnich has added a 3-acre lake to the farm and stocked it with fingerling bass, bluegills, and channel catfish. It's an attractive water hazard as well as a home for white-tail deer and migrating wood ducks.

A rustic clubhouse and a camping and picnic area also are part of the package.

"All of my decisions on how to use the land were based on the capability of the land," says Minnich. "I learned this commonsense approach by working with the Licking County Soil and Water Conservation District."

Minnich combines practicality with a willingness to experiment with new ideas. He's tried sheep on the golf course to cut down on grass mowing. And his rustic two-story clubhouse-home is made of untreated utility cedar poles salvaged from the city of Columbus, Ohio. Some of the clubhouse panels are made from cedar boards sawed from the poles. Minnich calls it his cedar attic chest, adding that "we've never been troubled by moths."

Minnich updates his conservation plan annually as part of his effort to "do right" by the land. He may add another fishpond to be used by Boy Scouts in the area.

Minnich, a world champion archery golfer, recently published a book on the subject and plans to begin an archery golf instruction school.

In the meantime, visitors to Minnich's recreation farm come early, stay late, and return often. With arrows in the air, a rustic clubhouse in the woods, and the quiet of rural Ohio around them, they're enjoying a welcome retreat from 20th century living. ♦

"Like a love affair"

Producing cattle on grass

American farmers and ranchers are being urged to produce more food and protect more land at the same time. Veteran Colfax County, New Mexico, rancher and conservationist Ed Salyer believes there's more than one way to do that.

"For years I was a wheat farmer on my 700 acres," says Ed Salyer. "But there were always problems with the wind and weather. If I did have a good wheat crop, I'd likely get hailed out. So, several years ago I planted all the land back to grass—bought $4,300 worth of seed at one time."

Asked if he would break his land out to crops again, Ed Salyer answered without hesitation, "If wheat went to $10 a bushel, I still wouldn't plow out my grass and clover."

What's his best grass?

"Western wheatgrass," he answered. "I can get a foot of snow and my cattle still graze it. When I first seeded to grass, the government program that helped pay the cost required me to mix a soil-building legume with the grass seed, so I added yellow blossom sweet clover. I'm mighty glad I did.

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"I thought at first my cows wouldn't eat that tall clover after it cured, but they sure do. They almost look like feedlot stock.

"We farmers need to produce more food, but in my part of New Mexico, with its unpredictable weather, grass will outproduce any crop. And it protects the soil. We don't have soil blowing now and very little washing."

Establishing a good stand of grass requires more than seeding the right kinds. You need to use your land and water the right way too.

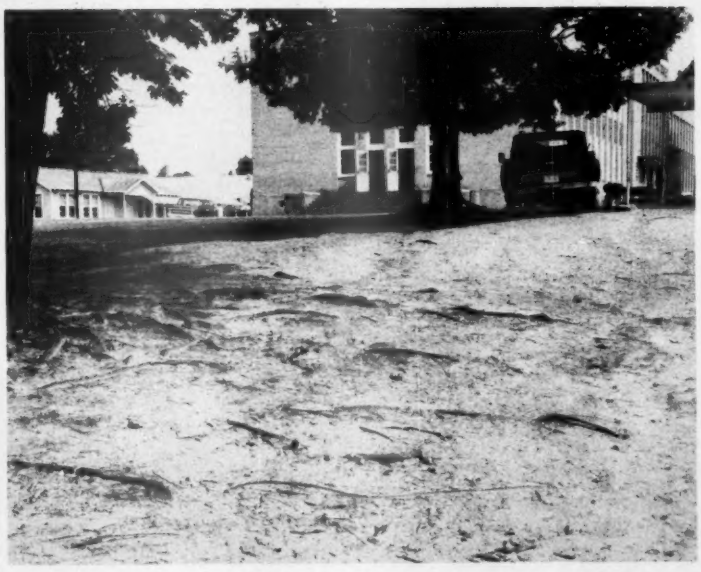
"You can overstock grassland with too many cattle and get along for a few years," says Salyer, "but you can't stay in business that way. Grass is like a love affair. If you take, you've gotta give. So my pastures get a rest in the spring or summer.

"As for water—I have an old playa lake bed. Before I built levees around it, the lake would catch so much water it drowned out some of my grass. Then when the land dried up, I had blowing dust. Now, my levees keep water out of the lake bottom and I can use that water to irrigate 100 acres of grass. I do this with a couple of 3-inch pumps and some portable pipes.

"Of course, I don't get enough water to irrigate every year — only when it rains enough that runoff water is available. And the lake bed itself is grassing over now."

Soil and water conservation is alive and well—and producing more beef—on Ed Salyer's ranch.—*Dick Barber, information specialist, SCS, Albuquerque, New Mexico.* ♦

A community fights erosion



Note exposed tree roots on bare school ground before the school and community tackled erosion problems.

by Gene Warren
Information specialist, SCS
Alexandria, Louisiana

"That grass is wonderful. It keeps the mud off the outdoor basketball court," said Glenn Wilkins, principal of Martin High School in Red River Parish, Louisiana, as we looked at the grassy slopes on his school ground.

Wilkins could be justly proud, because it was his teachers and students who sparked a green-up and cleanup program for the school grounds. And conservationists are also happy because the grass cover means less soil erosion.

Much of the school campus is built on sloping land, and the grass once was scanty. After student feet had pounded the ground bare, heavy rains would wash the soil away. Large tree roots became exposed, adding another hazard to the playground.

The "green-up" project started with Mrs. Minnie Maxie, natural resource teacher at the school. She asked Alvy Slatten, Soil Conservation Service district conservationist, to talk to her eighth grade class about conservation. Later, Slatten suggested that the class break up into groups and make

an inventory of conservation problems on the school ground.

"The response was good," Mrs. Maxie said. "The students reported that one problem was the large amount of erosion. We wrote Mr. Slatten asking that he come back and show us what we could do about it."

After a discussion with Principal Wilkins, permission was given in early 1972 to begin a conservation project.

The SCS district conservationist suggested ways to shape and terrace the ground and plant the grass. The parish police jury volunteered their equipment to level eroded slopes. The International Paper Company gave topsoil for the bare spots. Cattleman Olin Holly gave 15 bales of hay for mulch; the Holly Springs Baptist Church loaned their sprinkler system to irrigate the grass; the Red River Valley Experiment Station supplied the grass sod; and the SCS furnished no-mow bermudagrass sprigs.

Three kinds of grass were used. Tufcote bermudagrass was planted in heavily used areas, since it can stand a great deal of foot traffic; shade-tolerant no-mow bermudagrass was planted under trees; and common bermudagrass was planted on other areas. The Red River Parish School Board bought the seed and fertilizer.

The grasses passed their school test, and officials say the pounding the Tufcote bermudagrass has taken is unbelievable.

"Where we planted Tufcote beside common bermudagrass, you can see the difference very clearly," Principal Wilkins said. "Everywhere we planted the Tufcote the ground is in better shape, especially around slides and drinking fountains. Since the ground gets packed down hard after a year's playing, we will disc the area this summer so the grass can get a new foothold.

"We also used a terrace to divert some of the water that used to run onto the play area," Wilkins added. "This was especially beneficial while the grasses were forming a sod."

Everyone in town is pleased at the improved appearance of the Martin High School grounds. Mrs. Phyllis Cole, teacher at the school, said, "The playground used to be so rough the children had little usable space in which to play. Now, they can run around without tripping over tree roots, and they don't get as dirty because they have the grass to roll on."

But the story doesn't end here. Mrs. Maxie's eighth grade class has adopted the school ground as their outdoor conservation classroom project and class members pick up litter and keep the whole area looking better. As Mrs. Maxie notes, "we stopped soil erosion, got a better campus and had a real learning experience for the students all from the project." ♦

Growing more of everything

Jim Herd of St. Louis, Missouri, is an attorney, hunter, fisherman, nature lover, and part-time farmer. Combining his interests, he's made soil and water conservation work the law of the land on his 363 acres. It's paid off in:

—more and better corn and soybean crops
—better trees for timber, beauty, and birds
—fishing for food and fun, and
—more, and more varied, wildlife.

Two years ago, when Jim Herd bought his farm in northeast Missouri, he became a cooperator with the Knox County Soil and Water Conservation District. He worked with the local SCS district conservationist on how to do more for—and with—the land.

Mr. Herd decided to keep 129 acres of bottomland in crops, put 24 acres in pasture, and to use the remaining 210 acres for woodland production and wildlife habitat. He also renovated two old ponds to grow bass, bluegill, and channel catfish.

Mr. Herd followed the standard conservation practices for his farm crops. To increase wildlife, he provided annual food plots for quail and rabbits; built brush piles for winter cover; planted pine, autumn olive and black walnut trees; fenced out livestock from most of the area; kept the wooded marsh areas for wood ducks and cleared off part of a ridge top to create new "edge" and other browse areas for deer and turkey.

Jim Herd is convinced that wildlife, like corn or soybeans, is a crop from the land. Keep the land and water in good shape, he says, and you'll attract plenty of desirable visitors.—*David S. Mackey, district conservationist, SCS, Edina, Missouri.* ♦

Report from the Virgin Islands

Specialized footings are needed for this St. Thomas shore site.

Once called "the poorhouse of the West Indies" by President Herbert Hoover, the U.S. Virgin Islands now have the highest per capita income in the Caribbean. In a single decade, jet-age transportation has turned a rural agrarian economy into a tourist- and industry-oriented land of growing prosperity. But the resulting strains on the three major islands of St. Croix, St. John, and St. Thomas have been tremendous.

The islands are volcanic in origin with many steep slopes and "difficult" soils for building purposes. In the early 1960's, many land developers were ecologically unsophisticated about the problems they faced. One result was increased soil erosion, water pollution, and related problems. Floods became more frequent and more of the land's surface and ground water ran off into the sea, adding to a critical water supply problem. The marine environment suffered as large amounts of mud and sediment were deposited on beaches, ocean reefs, and other low-lying areas.

The Virgin Islands Conservation District was acutely aware of these problems. With technical help from the Soil Conservation Service, they moved to protect the 132 square miles making up the three islands. Through their early efforts, and with help from others, the Virgin Islands Environmental Protection Act was passed in March 1971.

The crux of the law is the Earth Change Permit, which must be obtained before approval to build is given. The permit is issued by the Virgin Islands Conservation District for builders on private lands. The Virgin Islands Department of Conservation and Cultural Affairs issues the permit for public lands.

A developer or property owner must agree to:

- Fit his development to the topography and soils as closely as possible.
- Save trees and other natural vegetation wherever possible.
- Avoid unnecessary disturbance of the soil.
- Install permanent storm drains and roads as early as possible.
- Protect denuded soils with

by William G. Saalman
District conservationist
and Carol F. Smith, SCS
St. Croix, Virgin Islands

mulch where permanent protection is delayed.

- Install permanent vegetation immediately after final grades are established.
- Use sediment basins where needed.
- Provide for proper water disposition. This may involve direct disposal or retention.
- Schedule construction operations so as to expose only the area of land that can be developed in a reasonable length of time; and
- Develop any sites located in natural recharge areas so that the site's overall capacity for recharge and storage of ground water is not diminished.

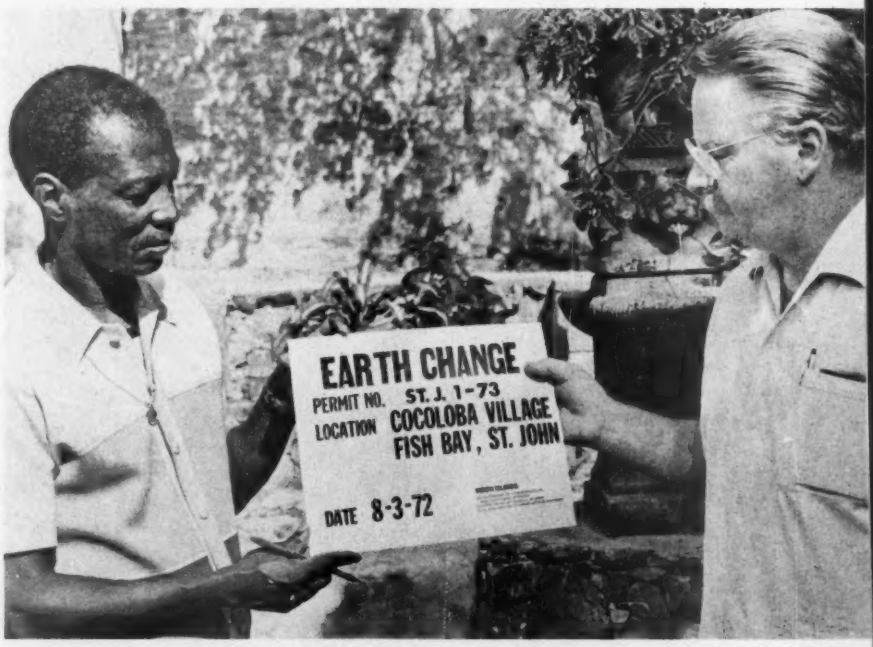
To date, 1,357 permits for development on private land have been issued by the Virgin Islands Conservation District, and 33 permits for public land changes have been issued by the Virgin Islands Department of Conservation and Cultural Affairs.

The St. Croix field office of the Soil Conservation Service has been impressed by the increased efforts of developers and landowners to incorporate conservation measures into their planning from the start. This reversal of the "hit and run" bulldozer techniques of previous years has resulted in the introduction or increased use of such concepts as cluster development, fitting new buildings to the natural topography of an area, and better methods of storm water management.

One reason for the jump in conservation practices is early work by the Virgin Islands Conservation District. Before the Earth Change Permit became a requirement, SCS and District people helped bring together members of the construction industry, conservationists, and local government people to hammer out the guidelines for an environmental protection handbook. This was published before the law went into effect in late 1972 and helped educate the public on the changes.

Hardheaded businessmen and developers are discovering that the extra money needed to apply good conservation measures not only improves the appearance of their developments, making sales and rentals easier, but also protects their long-range investment. ♦

The Virgin Islands are implementing a recently passed (1973) zoning regulation. This defines more clearly how land may be used. The Legislature and the Planning Office are considering revisions in the present subdivision law which will provide for more comprehensive controls over land to be subdivided. The proposed changes require developers to submit a copy of their approved earth change plan. Thus, the earth change permits are complementary to both the new zoning regulations and the proposed new subdivision legislation.



Earth Change Permit Number 1. A step in the right direction.

Diagnosing the Great Lakes

The Great Lakes are the largest body of fresh water in the world. They cover an area of almost 100,000 square miles and have a drainage basin three times that size. On their extensive shorelines—more than 3,500 miles long in the United States alone—are the cities of Milwaukee, Chicago, Detroit, Cleveland, Buffalo, and Toronto. They are a major transportation artery and an important source of water-based recreation to the 35 million people within the basin.

In short, the Great Lakes form one of the most important resources of the North American continent.

To insure more protection of the Great Lakes, the United States and Canada signed the Great Lakes Water Quality Agreement in 1972. One of its provisions is that the already existing International Joint Commission "enquire into and report upon pollution of the boundary waters of the Great Lakes system from agricultural, forestry, and other land use activities, in accordance with the terms of reference attached to this agreement." The terms of reference, paraphrased, ask the following questions:

1) **Are the Great Lakes being polluted by ground and surface runoff from various land uses?**
2) **If so, to what extent, by what causes, and where?**
3) **What remedial measures would help to substantially reduce this pollution and what would it cost?**

An International Reference Group on Great Lakes Pollution From Land Use Activities was set up to answer these questions. The reference group includes United States and Canadian experts from state, provincial, and both federal governments. Norman A. Berg, Associate Administrator of the Soil Conservation Service, is United States cochairman of the group; his Canadian counterpart is Dr. Murray G. Johnson, an eminent limnologist with the Canada Centre for Inland Waters.

The first phase of the study, a state-of-the-art assessment of the problems, is nearly completed, with SCS supplying the erosion and sedimentation portion. The second phase, an inventory of land uses, is well underway, using Earth Resources Technology Satellite (ERTS) data. This latter work is being done at Purdue University's Laboratory for Application of Remote Sensing, with field checks by SCS technicians.

The next job is to monitor the flow from several selected watersheds within the Great Lakes Basin. The watersheds were chosen to include a variety of soil types and land uses.

The final task, before specific answers to the questions of pollution cause and control can be formulated, is to diagnose the degree of impairment of water quality from pollutants carried into the lakes from the land.

The study, scheduled for completion in 1977, should provide much of the information needed to make rational land use decisions in the Great Lakes Basin.—*Gerald B. Welsh, Resource Development Division, SCS, Washington, D.C.* ♦

Shoreline erosion along Lake Huron.

Building a data base

The public's ability to make rational land use decisions, either directly or through elected officials, depends on its knowledge of land and water properties and limitations. Environmental decisions need to be based on solid data concerning the nature, characteristics, and geographical distribution of an area's natural resources.

Most towns and cities in the United States do not possess comprehensive data on their soils, water, vegetation, or wildlife. Until recently, this was true of Passaic Township, New Jersey. Yet few areas needed such information more.

Passaic Township is essentially a suburban community within the heavily populated metropolitan corridor stretching down the Atlantic seaboard from Boston to New York, Philadelphia, Wilmington, Baltimore, and Washington, D.C. The life of the township has been heavily influenced by economic and population pressures.

In Passaic Township, these man-made pressures have run into serious natural resource constraints.

The northern section of the township forms part of the Great Swamp and is an important migratory bird habitat. Fifteen hundred acres in the southern part of the township lie on the Passaic River flood plain. Both of these facts place serious obstacles in the path of extensive land development.

Passaic Township Environmental Commission members review soil survey information. Left to right: Mrs. Elizabeth Frasier, Lester L. Seglin, SCS field resource conservationist, and Mrs. Ann Morris.

To determine the nature and extent of such natural constraints, the Passaic Township Environmental Commission organized a volunteer project to chart and inventory the natural resources of their township. More than 50 local residents were volunteer workers. Funds for the program came from the township, and technical assistance was provided by the Morris County Soil Conservation District.

Using Soil Conservation Service data and information from the county's soil survey, a series of color-coded maps helped to illustrate such critical soil-related properties as depth to bedrock and how this relates to whether certain areas are suitable for heavy buildings, roads, or other uses. These maps were augmented by another series showing important social and historical aspects of the land.

More effort went into gaining information on the area's climate and geologic formations and its water, wildlife, and vegetative resources. All of this culminated in a 50-page book on the natural resources of the township.

With the maps and book as a guide, volunteers made "on the land" observations of the remaining undeveloped land in Passaic Township. The area was divided into a number of sections 10 acres or more in size. Each section was visited by two volunteers who recorded soils and other information about the area. All of this went into the final inventory.

Although designed principally for use by the township government, the Passaic inventory is also helpful to local schools and to private land developers. The project has stimulated similar work elsewhere in the state.—*Elmer F. Sauer, district conservationist, SCS, Morristown, New Jersey.* ♦

Recon . . .

U.S. farmers comprise less than 5 percent of the population. But they have production assets exceeding $300 billion, spend $64 billion in 1 year to pay production expenses, pay property taxes of more than $3 billion a year, and have close to an $80 billion debt load that is expected to double within 10 years.

One out of five jobs in the United States is related to agriculture, and at the heart of this is the American farmer.

Agriculture is the nation's largest industry, employing 4.4 million persons directly and supporting another 10 to 12 million jobs in machinery, chemical, public utilities and other industries, and in processing and marketing food products.

Nonpoint agricultural pollutants are organic and inorganic materials entering surface and ground water from nonspecific sources in sufficient quantity to constitute a pollution problem. They include sediment, plant nutrients, pesticides, and animal wastes from cropland, rangeland, pastures and farm woodlots. Sediment is the major pollutant in terms of volume. A new study, "Methods and Practices for Controlling Water Pollution from Agricultural Nonpoint Sources," which was prepared for the U.S. Environmental Protection Agency by the Economic Research Service, U.S. Dept. of Agriculture, is available from the U.S. Government Printing Office, Washington, D.C. 20402 for $1.10.

Environmental improvement action must be geared to the local level and based on community needs, according to Roger W. Powers, president of Keep America Beautiful, Inc.

Mr. Powers scored the "gloom and doom" syndrone which has marked some recent public attitudes toward the environment, in which "the average citizen threw up his hands in despair and resigned his grandchildren to a treeless future, where water would be strictly rationed and gas masks the order of the day. This attitude is changing," he said, "and individuals are realizing that their actions and inactions have an environmental impact . . . and that the world their grandchildren will inherit will be just as environmentally sound as they are willing to work—perhaps sacrifice—to make it."

Keep America Beautiful, Inc., was founded in 1953 as a national, nonprofit public service organization working with individuals, government agencies, and private industry to stimulate individual involvement in improving the environment.

"It is the people who determine environmental policy and the means of carrying out that policy must be as responsive as possible to the public's desires. That is done by the Congress enacting and amending laws and overseeing their implementation. The credibility gaps and cynicism which are regrettably so rampant today make it all the more essential that environmental decisions not only be wise and well-founded, but that the public knows this to be true.

"One way to improve the public's opinion is through greater citizen participation in standard-setting and other regulatory procedures. The public should not only be allowed to participate in such matters, but they should be encouraged to do so —and we should bend over backwards to facilitate that participation."—Russell E. Train, *Administrator, U.S. Environmental Protection Agency. (Remarks before the National Conference of Standards for Environmental Improvement.)*

Energy development affects land use — "Major land use decisions will be required to properly site the hundreds of new energy facilities to be built in the next 25 years in this country. These include nuclear and coal fired powerplants, refineries, coal conversion plants, geothermal units, and a wide array of petroleum handling facilities both onshore and off. From a land consumption point of view, electric transmission line rights-of-way already cover an area larger than the State of Connecticut and, by the year 2000, an area the size of New Jersey will be added."—*Russell W. Peterson, Chairman, Council of Environmental Quality.*

Review

Real estate buyers in northern New Hampshire may now refer to the new Real Estate Buyers' Checklist prepared by the North Country Resource Conservation and Development Project. Aim of the publication is to help promote good land use, encourage better housing developments, and increase the satisfaction and happiness of people moving to the area. The checklist, developed by a committee of real estate people, bankers, town officials, and technical specialists, includes a questionnaire on site development, information on subdivision regulations, community and private services, and a directory of where to go for further help.

The U.S. Forest Service recently inventoried the commercial forest lands in the 187-million acre National Forest System and found that 3.3 million acres currently need reforesting. In the main, these under-producing areas were affected by fires, windstorms, insects, and disease—or are lands acquired by the Forest Service in a logged-off or farmed-out condition.

Plants, Animals, and Man. Proceedings of the 28th Annual Meeting of the Soil Conservation Society of America (7515 Northeast Ankeny Road, Ankeny, Iowa 50021). *1974. 272 pp., illus.* $5.

This publication contains 56 papers by individuals in the fields of education and research. It covers such topics as the state's role in land use planning, the impact of air pollution on the forest resource, legislation regulating surface mining, changing concepts in outdoor recreation, fish and wildlife habitat improvement in watershed projects, and the role of the natural resource specialist in adult education.

Farming Terraced Land. Written by Paul Jacobson and Walter Weiss, 1952; revised by R. C. Barnes, Jr. *1973. USDA Leaflet No. 335. 16 pp., illus. $0.25.*

Explains and illustrates various methods of farming terraced land. Describes how to use both the one-way and the two-way plows on nonparallel and parallel terraces; how to use other tillage implements; methods of planting row crops on nonparallel and parallel terraces; and how to harvest close-sown crops, row crops, and hay.

For the fun of it . . . and then some! *1974. USDA-Soil Conservation Service. PA-1060. 11 pp., illus. $0.35.*

A colorful, informative booklet on the economic benefits and recreation, and community growth gained through small watershed projects and area response.

Community improvement through resource conservation and development. *1974. USDA-Soil Conservation Service. PA-1077. 16 pp., illus. $0.40.*

This booklet provides specific answers to the most commonly asked questions about the RC&D projects. The booklet tells what an RC&D project can, and can't do; how local people can organize a project and plan an RC&D program of action; and how the federal government, state agencies, and local individuals participate. Various measures undertaken by RC&D projects across the country are illustrated with colored photographs.

Environmental Conservation Education: A Selected Annotated Bibliography. Compiled for the Conservation Education Association. *1974. Interstate Printers & Publishers, Inc., Danville, Illinois 61832. 70 pp. $2.50.*

Subject categories of this comprehensive bibliography include: Environmental Awareness, Ecology, Air, Animals, Energy, Minerals, Plants, Soil, Water, Conservation (General), Consumer Patterns, History of Resource Use, Planning and Managing Natural Resources, Population, Quality of the Environment, Social Implications of Conservation, Urban Environment, Environmental Education and Career Opportunities. This bibliography should be useful to teachers and other persons interested in or working with organizations or agencies concerned with conservation education.

Review

Water, A Primer. Luna B. Leopold. *1974. W. H. Freeman and Company, San Francisco, California. 172 pp., illus. $4.95 (cloth), $2.95 (paperback).*

This highly informative, well written book covers the general principles of hydrology and many facts concerning water use. It contains simple but technically sound information written in terms understandable to the nonspecialist. The principles and concepts which it explains, with one or two minor exceptions, are consistent with those accepted by the Soil Conservation Service (SCS).

The book is divided into two major parts: Hydrology and Water Supplies and Water Use.

The hydrology section discusses precipitation, surface water and ground water, surface runoff and storage, the drainage network, flow frequency and floods, the flood plain and the channel, the load of rivers, and soil, plants, and water. The discussion of the hydrologic cycle is simple and adequate. The author describes the relationships of infiltration, surface runoff, aquifers, and ground water, as well as the movement of water in saturated materials. Surface runoff and storage is discussed in considerable detail including the U.S. Geological Survey stream-gaging program and water supply papers. A streamflow hydrograph is described and the time-discharge rate relationships explained.

The discussion of drainage networks describes stream patterns and stream orders. An explanation of flow frequencies and floods helps readers to understand the probability of flood occurrences and explains the functions of flood plains and channels. Sediment and other water pollutants are described; and soil moisture relationships, erosion, and plant cover are discussed in the section on soil, plants, and water.

Part II, Water Supplies and Water Use, discusses water in the world, the water budget and the amount of water available, and its present use. The last chapter is the most interesting to people concerned with SCS programs. The use of water in homes and cities is discussed as well as city water systems, including water purification and distribution and sewage and waste treatment.

The discussions of irrigation and farm ponds vary somewhat from concepts generally accepted by SCS. The book seems to recommend heavy leaching and subsurface drainage to manage soluble salts while SCS leans more toward planned applications which replace needed soil moisture within the root zone.

The section on farm ponds emphasizes the loss of water by surface evaporation, the need for ponds to be designed to minimize these losses, and the loss of downstream flow volumes because of farm pond impoundments. SCS does not fully subscribe to this last concept. Firsthand observation and more detailed studies indicate that downstream losses due to farm ponds are negligible. In the semiarid and arid West where such losses would be important, observation shows that farm ponds most commonly are filled by localized thunderstorms, the runoff from which usually would be absorbed by streambeds before it goes into downstream reaches.

This runoff even without farm ponds would not be available to downstream users in most instances. This concept was verified by the studies of consulting engineers on the Brazos River in Texas.

The discussions of flood control are very good and the upstream—downstream concepts are fully consistent with those held by SCS.

Water, A Primer is a good book that will provide informative, worthwhile reading to anyone interested in learning more about this subject. **—Eugene C. Buie, *assistant deputy administrator—River Basins, SCS, Washington, D.C.***

Soil surveys

Indiana

Shelby County. By Shelby H. Brownfield. *1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 92 pp., illus.; maps.*

Minnesota

Hennepin County. By Robert A. Lueth. *1974. Soil Conservation Service in cooperation with Minnesota Agricultural Experiment Station. 159 pp., illus.; maps.*

Missouri

Caldwell County. By Allan H. Jeffrey. *1974. Soil Conservation Service in cooperation with Missouri Agricultural Experiment Station. 56 pp., illus.; maps.*

Nebraska

Polk County. By Vernon C. Seevers and Robert S. Pollock. *1974. Soil Conservation Service in cooperation with University of Nebraska Conservation and Survey Division. 80 pp., illus.; maps.*

Oregon

Yamhill Area. By George E. Otte, Duane K. Setness, Walter A. Anderson, Fred J. Herbert, Jr., and Clarence A. Knezevich. *1974. Soil Conservation Service in cooperation with Oregon Agricultural Experiment Station. 130 pp., illus.; maps.*

Utah

Salt Lake Area. By Lowell Woodward, John L. Harvey, Karl M. Donaldson, Jungi J. Shiozaki, Garth W. Leishman, and J. Howard Broderick. *1974. Soil Conservation Service in cooperation with Utah Agricultural Experiment Station. 132 pp., illus.; maps.*

Meetings

August

11–14 *Conservation Education Association, Syracuse, N.Y.*
11–14 *National Farm and Power Equipment Dealers Association, Minneapolis, Minn.*
11–14 *Soil Conservation Society of America, Syracuse, N.Y.*
12–14 *Conference on Great Lakes Research, Ontario, Canada*
12–20 *Tenth International Congress of Soil Science, Moscow, U.S.S.R.*
14–16 *American Society of Civil Engineers, Irrigation and Drainage Conference, Biloxi, Miss.*
18–21 *American Institute of Chemical Engineers, Salt Lake City, Utah*
18–21 *American Agricultural Economics Association, College Station, Tex.*

September

4–6 *American Water Works Association Chesapeake Section, Ocean City, Md.*
8–11 *American Fisheries Society, Honolulu, Hawaii*
9–13 *Seventh Congress—International Association for Research Into Water Pollution, Paris, France*
10–14 *Third International Man, Air, Water, Noise, and Waste Exhibition, "Environmental Expo," Paris, France*
11–13 *International Association of Game, Fish and Conservation Commissioners, Honolulu, Hawaii*
22–26 *National Association of State Departments of Agriculture, Milwaukee, Wis.*
22–27 *SCS State Conservationists Annual Meeting, Lexington, Ky.*
22–27 *Association of Conservation Engineers, Rapid City, S. Dak.*
29–Oct. 2 *American Forestry Association, Mackinac Island, Mich.*

October

5–8 *National Environmental Sanitation & Maintenance Education Conference, Chicago, Ill.*
6–11 *Water Pollution Control Federation, Denver, Colo.*
9–13 *American Horticultural Society, Arlington, Va.*
10–11 *American Forest Institute, Minneapolis, Minn.*
11–14 *National Association of Biology Teachers, Inc., New York, N.Y.*
12–15 *Farm and Industrial Equipment Institute, Orlando, Fla.*
14–17 *American Society for Testing and Materials, Detroit, Mich.*
15–18 *Future Farmers of America, Kansas City, Mo.*
15–18 *National Conference of Editorial Writers, Louisville, Ky.*
15–18 *National Recreation Research Applications Workshop, Copper Mountain, Colo.*
20–24 *National Association of County Agricultural Agents, Tucson, Ariz.*
20–25 *National Congress for Recreation and Parks, Denver, Colo.*
21–25 *Association of Engineering Geologists, Denver, Colo.*
21–25 *American Society of Civil Engineers, Kansas City, Mo.*
23–26 *National Council for Geographic Education, Chicago, Ill.*
27–30 *Sprinkler Irrigation Association, Lake Buena Vista, Fla.*
28–30 *American Plywood Association, Houston, Tex.*
31–Nov. 1 *American Association For Vocational Instructional Materials, Atlanta, Ga.*

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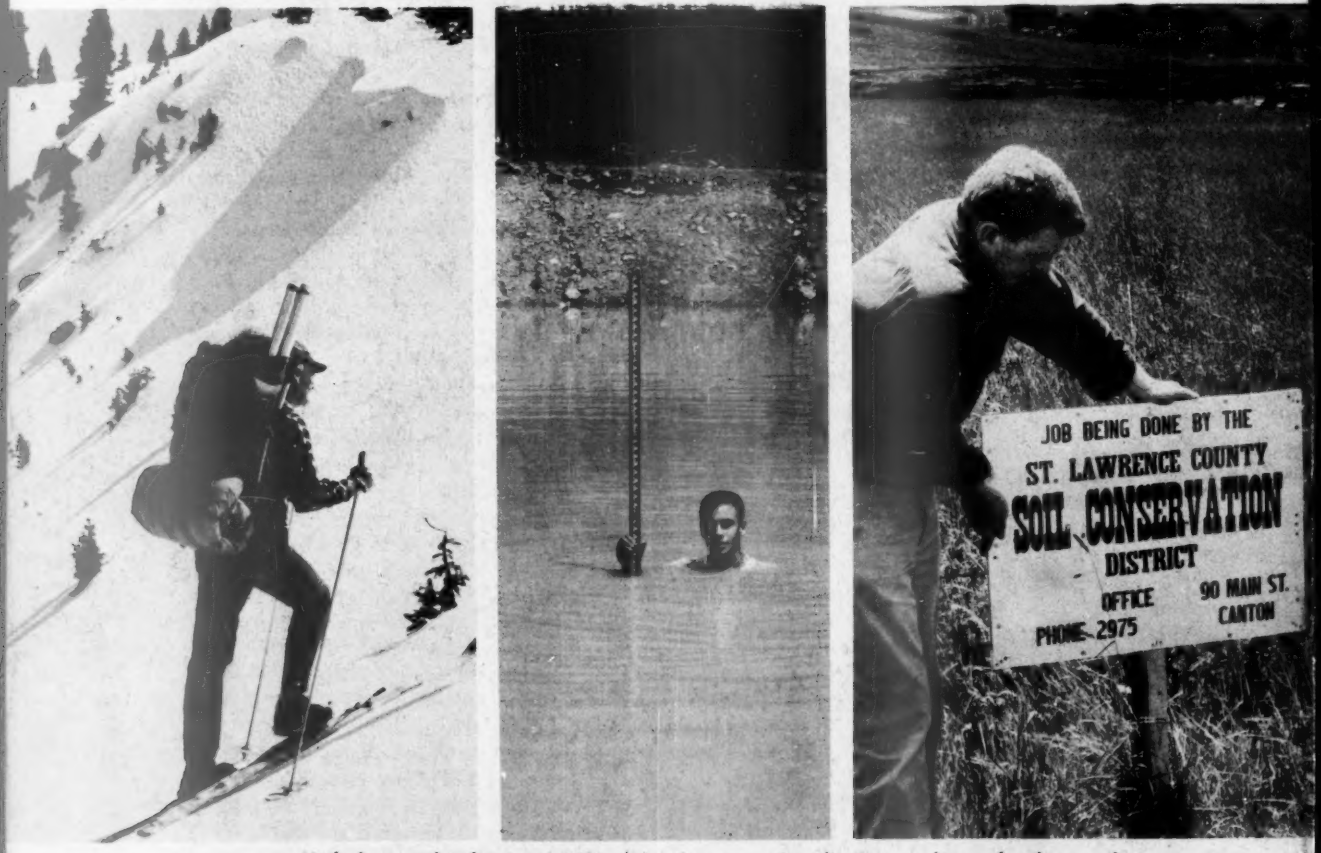

High, low, and in between—SCS and soil conservation district people are hard at work. Here, a snow surveyor packs into Arizona's Baldy Wilderness Area; an SCS technician checks depth of a Connecticut irrigation reservoir; and a man and a sign advertise a Pennsylvania district's part in building a pond.